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| EXAMINER<br>YOUNG, NATASHA E  |             |                           |                     |                  |
| ART UNIT<br>1797  |             | PAPER NUMBER              |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/538,409

**Applicant(s)**

DUINEVELD ET AL.

**Examiner**

NATASHA YOUNG

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newsome et al (US 2004/0115344 A1) in view of Becker et al (US 6,294,063 B1) and Smith et al (US 6,527,964 B1).

Regarding claim 4, Newsome et al discloses a substrate (30) to receive a small object (40) suspended in a fluid in depression (42) through self-alignment (see paragraph 0079 and figure 7), after a solution of electrically conductive material is applied to the substrate and dries, electrical connections are formed for the devices (see paragraph 0080), and that evaporation deposition is well known in the art (see paragraph 0005).

Newsome et al is silent regarding the small object is carried by a droplet and does not disclose that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic.

Becker et al discloses a solid encapsulated in a liquid and is manipulated on a reaction surface (see column 2, line 53 through column 3, line 37).

Smith et al discloses a substrate and a slurry which includes a fluid and a plurality of elements (each of which includes a functional component), the substrate is exposed to a surface treatment fluid to create a surface on the substrate which has a selected one of a hydrophilic or a hydrophobic nature, the fluid is selected of one of a hydrophilic or a hydrophobic nature, and the plurality of elements is exposed to a surface treatment fluid to create surfaces on the elements having a selected one of a hydrophilic or a hydrophobic nature (see Abstract).

It would have been obvious to one having ordinary skill in the art the time the invention was made to modify the teachings of Becker et al such that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic in order to reduce the amount of friction between the blocks and the substrate (see Smith et al column 13, lines 10-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Newsome et al with the teachings of Becker et al and Smith et al such that a small object is carried by a droplet and that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic in order to programmably manipulate a packet, or small object, (see Becker et al Abstract) and to reduce the amount of friction between the blocks and the substrate (see Smith et al column 13, lines 10-31).

Regarding claim 7, Newsome et al discloses a substrate (30) to receive a small object (40) suspended in a fluid in depression (42) through self-alignment (see paragraph 0079 and figure 7), after a solution of electrically conductive material is applied to the substrate and dries, electrical connections are formed for the devices (see paragraph 0080), and that evaporation deposition is well known in the art (see paragraph 0005).

Newsome et al is silent regarding the small object is carried by a droplet and does not disclose that the object is aligned with respect to the placement position by means of a magnetic field.

Becker et al discloses a solid encapsulated in a liquid and is manipulated on a reaction surface (see column 2, line 53 through column 3, line 37).

Smith et al discloses the blocks can be moved across the substrate in a number of ways, including forced fluid flow, suction, gravity, magnetic fields if the blocks have magnetic characteristics, or any combination of these driving forces (see column 15, line 45 through column 16, line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Newsome et al with the teachings of Becker et al and Smith et al such that a small object is carried by a droplet and that the object is aligned with respect to the placement position by means of a magnetic field in order to programmably manipulate a packet, or small object, (see Becker et al Abstract) and to move the small object across the substrate (see Smith et al column 13, lines 10-31).

Regarding claims 2 and 12, Newsome et al discloses a first process step for depositing a first material on the substrate (see paragraphs 0075 and 0083) and droplets are deposited in the wells of the banks while they are still wet and a laser may be used to expose a photosensitive material in order to create a contrast in the wetting properties (see paragraphs 0076-0078) such that a good-wetting position and a poor-wetting position may be constructed.

Newsome et al does not disclose that the final placement of the object is in a good-wetting position and the near vicinity on the substrate near the final placement position is the poor-wetting position in contrast to the good-wetting position

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the initial position of the small object in near vicinity of the final position, which is the poor-wetting position, and move to the final position of good - wetting, since it has been held that rearranging parts on an invention involves only routine skill in the art (see MPEP 2144.04 (VI-C)).

Claim 3 depends on claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claims 3 and 13, Newsome et al discloses the contrast of wettability of the substrate is provided a laser to expose photosensitive material.

Newsome et al does not disclose that the contrast in wettability of substrate is provided by a monolayer of a suitable molecule, which monolayer is made by micro-contact printing.

Smith et al discloses the contrast in wettability of the substrate is provided by a monolayer (see column 13, lines 32-54).

It would have been obvious to one having ordinary skill in the art the time the invention was made to modify the teachings of Newsome et al such that the contrast in wettability of the substrate is provided by a monolayer in order to reduce the amount of friction between the blocks and the substrate (see Smith et al column 13, lines 10-31).

It would have been an obvious matter of design choice to have the contrast in wettability of substrate is provided by a monolayer of a suitable molecule, which monolayer is made by micro-contact printing, since applicant has not disclosed that having the contrast in wettability of substrate is provided by a monolayer of a suitable

molecule, which monolayer is made by micro-contact printing solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the contrast in wettability of substrate is provided by a monolayer of a suitable molecule, which monolayer is made by micro-contact printing.

Regarding claims 5 and 14, the prior art references do not disclose that the small object is pre-treated by a dissolvable layer on a surface thereof.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the small object is pre-treated by a dissolvable layer on a surface thereof, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding claims 6 and 15, Newsome et al does not disclose that the surface structure of the substrate is pre-treated physically, such that the edge of the fluid meniscus is guided by grooves and ridges of the physically pre-treated structure to the final placement position of the small object.

However, Newsome et al discloses the depressions (42) are shaped to correspond to the shapes of the blocks (40) (see paragraph 0079) and a laser may be used to pattern the substrate (30) (see paragraph 0080) such that the surface structure of the substrate may be pre-treated physically, in that way that the edge of the fluid meniscus is guided by grooves and ridges of the physically pre-treated structure to the final placement position of the small object.



Regarding claim 8, Newsome et al disclose that the placement position (42) on the substrate has a shape which corresponds to the shape of the small object (40), so that the object (40) is aligned to match with the final placement position (42) (see paragraphs 0079-0080) and that evaporation deposition is unknown in the art (see paragraph 0005).

Newsome et al is silent regarding the small object is carried by a droplet.

Becker et al discloses a solid encapsulated in a liquid and is manipulated on a reaction surface (see column 2, line 53 through column 3, line 37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Newsome et al with the teachings of Becker et al such that a block (40) is suspended in a droplet and aligned in the final placement position (42) by evaporation in order to programmably manipulate a packet, or small object, (see Becker et al Abstract).

Regarding claim 9, Newsome et al disclose pre-treating a substrate with a first material (see paragraph 0075), placing the block (40) in the depression (42) and the block (40) is suspended in a fluid (see paragraphs 0079-0080), while the blocks (40) are suspended in fluid and are assembled on the patterned substrate a solution of an electrically conductive material, such as PEDOT, is deposited on the substrate (see paragraph 0080), that positioning the object (40) to the placement position (42) by fluid self-assembly (see paragraph 0079) and that evaporation deposition is known in the art (see paragraph 0005), and that it will be clear to persons skilled in the art that the invention is suitable for depositing interconnection between isolated circuits, which are

provided on a substrate by means others than FSA (see paragraph 0081) and that photolithography is known in the art (see paragraph 0005) such that interconnecting the object (40) by standard lithographic way.

Newsome et al is silent regarding the small object is carried by a droplet and does not disclose that object is pre-treated by a monolayer to make the side of the object in contact with the substrate hydrophilic, placing the small object by rough placement of the object on the substrate in the vicinity of a defined placement position of the object, placing a droplet (4) on the substrate in the vicinity of the placement position of the small object, moving the droplet (4) from the poor wetting area to the good wetting area, and orienting the object with respect to the placement position by means of a magnetic field.

However, Newsome et al discloses a first process step for depositing a first material on the substrate and a second process step such as coating the substrate with an insulating layer (see paragraphs 0075 and 0083), droplets are deposited in the wells of the banks while they are still wet and a laser may be used to expose a photosensitive material in order to create a contrast in the wetting properties (see paragraphs 0076-0078) such that a good-wetting position and a poor-wetting position may be constructed, while the blocks 40 are suspended in fluid and are assembled on the patterned substrate a solution of an electrically conductive material, such as PEDOT, is deposited on the substrate (see paragraph 0080), and that a large number of processing may be performed on the substrate to create a wide variety of different devices (see paragraph 0082)

Becker et al discloses a solid encapsulated in a liquid and is manipulated on a reaction surface (see column 2, line 53 through column 3, line 37).

Smith et al discloses a substrate and a slurry which includes a fluid and a plurality of elements (each of which includes a functional component), the substrate is exposed to a surface treatment fluid to create a surface on the substrate which has a selected one of a hydrophilic or a hydrophobic nature, the fluid is selected of one of a hydrophilic or a hydrophobic nature, and the plurality of elements is exposed to a surface treatment fluid to create surfaces on the elements having a selected one of a hydrophilic or a hydrophobic nature (see Abstract) and orienting the object with respect to the placement position by means of a magnetic field (see column 15, line 45 through column 16, line 2).

It would have been obvious to one having ordinary skill in the art the time the invention was made to modify the teachings of Becker et al such that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic in order to reduce the amount of friction between the blocks and the substrate (see Smith et al column 13, lines 10-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Newsome et al with the teachings of Becker et al and Smith et al such that a small object is carried by a droplet and that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic in order to programmably manipulate a packet, or small object, (see Becker et al Abstract), to reduce the amount of friction between the blocks and the

substrate (see Smith et al column 13, lines 10-31), and to move the small object across the substrate (see Smith et al column 13, lines 10-31).

Regarding claim 10, Newsome et al does not disclose a system wherein the object is provided with a magnetic field layer, and wherein the object is aligned with respect to the placement position by means of a magnetic field.

Becker et al discloses a solid encapsulated in a liquid and is manipulated on a reaction surface (see column 2, line 53 through column 3, line 37).

Smith et al discloses the blocks can be moved across the substrate in a number of ways, including forced fluid flow, suction, gravity, magnetic fields if the blocks have magnetic characteristics, or any combination of these driving forces (see column 15, line 45 through column 16, line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Newsome et al with the teachings of Becker et al and Smith et al such that a small object is carried by a droplet and that the object is aligned with respect to the placement position by means of a magnetic field in order to programmably manipulate a packet, or small object, (see Becker et al Abstract) and to move the small object across the substrate (see Smith et al column 13, lines 10-31).

Regarding claim 11, Newsome et al does not disclose that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic.

Smith et al discloses a substrate and a slurry which includes a fluid and a plurality of elements (each of which includes a functional component), the substrate is exposed to a surface treatment fluid to create a surface on the substrate which has a selected one of a hydrophilic or a hydrophobic nature, the fluid is selected of one of a hydrophilic or a hydrophobic nature, and the plurality of elements is exposed to a surface treatment fluid to create surfaces on the elements having a selected one of a hydrophilic or a hydrophobic nature (see Abstract).

It would have been obvious to one having ordinary skill in the art the time the invention was made to modify the teachings of Newsome et al such that the small object is pre-treated by a monolayer to make a side of the object in contact with the substrate hydrophilic in order to reduce the amount of friction between the blocks and the substrate (see Smith et al column 13, lines 10-31).

Regarding claim 16, the prior art references do not disclose that the small object is pre-treated by a dissolvable layer on a surface thereof.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the small object is pre-treated by a dissolvable layer on a surface thereof, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

### ***Response to Arguments***

Applicant's arguments, see Remarks, filed June 19, 2008, with respect to the rejection(s) of claim(s) 2-9 under U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Smith et al (US 6,527,964 B1).

Applicant's arguments, see Remarks, filed June 19, 2008, with respect to objection to the specification and objection to claim 9 have been fully considered and are persuasive. The objections of the specification and claim 8 have been withdrawn.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See Cohn (US 5,355,577).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATASHA YOUNG whose telephone number is (571)270-3163. The examiner can normally be reached on Mon-Thurs 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NY

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